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Reinforcement strategic program in environmental education

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Abstract

The human environmental behaviour change is a difficult and long term aim, with no guarantee of the final efficiency. A national project that proposes the elaboration and implementation of an encouraging environmental responsible behavior program amongst children was made. A cross-sectional study was conducted among students aged 7-8 years old from three schools by using anonymous questionnaires, which assessed their environment related knowledge, attitudes and behaviours. The results indicate that even though children have satisfactory knowledge, they do not act consequently, so pro-environmental education is still necessary, and the positive reinforcement is recommended.

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Keywords: behaviors, children, environment, positive reinforcement, strategies

1. Introduction

Although *homo sapiens sapiens*, the Man doesn't ever excel in preservation of his planet, not for him, nor for future generations. He has produced irreversible changes in environmental factors, in spite of his minuscule life span on the Earth comparing with the geologic time (Baron and Byrne, 2000). Preserving our life and labor environment can be made by both technological methods which reduce some of the environmental problems, and behavioral changes on the community level. But changing human behavior is time consuming and not easy to do. Many times, it will require more than reasoning to make people refrain from behaviors that are environmentally destructive, although personally satisfying. It's about the commons dilemma, or the commons tragedy, in which short-term personal gains (satisfaction) conflict with long-term societal needs (Bell et al, 2001).

On the international level, innovative technologies for restoring the environment have received considerable attention, even most technologies have unfortunate side-effects on the environment (modern transport has resolved the problem of locomotion but has generated pollution, and so on). In contrast, relatively less attention has focused on strategies for preserving the environment that involve changes in people's behavior, although in cases where technology cannot fix the problem (e.g., dealing with littering), changing our behavior is the best means of coping (Howard, 2000).

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2. Environmental risk perception

Human behavior is influenced by people's perception of environmental risks (Condrea & Bostan, 2009). Generally, human being perceive the risks in his spatial and temporary proximity, or the risks which strongly stimulate the sensorial systems (a noise, a strong heat), ignoring or adapting to the slowly changes. From this point of view, human being can be compared with the legendary frog immersed in water: if we introduce the frog into a hot water bowl she will react immediately by jumping outside; if we putt the frog into a cold water bowl which is gradually warmed, the frog will be boiled along with the water.

The perception of risk is not the same as risk calculated by experts (Siegrist et al, 2005; Sjöberg, 2000; Sjöberg, 2003). Perceived risks tend to be higher if the activities associated with them are seen as uncontrollable, inequitable, catastrophic, unknown, dreadful, and likely to affect future generations; such is the case, for example, with people's perceived risks about nuclear power. In contrast, perceived risks tend to be lower if the activities associated with them are seen as voluntary, individual, not globally catastrophic, easily reduced, and of low risk for future generations; such is the case for swimming and food preservatives (Slovic, 1987).

We would not be exaggerating if we asserted that almost everything any of us does has either a positive or a negative impact on our environment (Adeola, 2004). Sometimes it is hard to figure out whether our behaviors are helping or hurting the environment. The desired outcome must be the sustainable future – a place in which we do not destroy resources, and in which we ensure that a high quality of life is available for future generations (Greim & Snyder, 2008).

Nowadays, we can see a tendency to change the dominant worldview (about the commons management) with the New Environmental Paradigm which asserts, among other things, that anyone of us can have unintended negative consequences for the environment (Dunlap & Van Liere, 1978; Dunlap et al., 2000; Dunlap, 2008; Stern, 2000; Taylor, 2000).

The human behavior change is a difficult and long term aim, with no guarantee on the final efficiency (Rippl, 2002). Besides, influencing the human behavior depends on population target. At adults the change of the behavior can be time-consumption and ineffective, because the learning is proper for the youngster. That's why the proper targets seemed to be the youngest children, the age when they become aware of what happened around them and of how they must behave accordingly with their life environment (Boholm, 2003).

There are two ways to influence the environmental behaviors:

encouraging environmentally protective acts (e.g., rewarding people for recycling)

discouraging environmentally destructive behavior (e.g. high fines for littering).

Unfortunately, programs that encourage protective behaviors do not necessarily inhibit destructive behaviors, and vice versa.

What population target should be choosing? Theoretically, the behavioral changing can be approached on every age group, but the efficiency varies from a group to another. The behaviors (good or bad) are consolidated in the first years of life and continue to teenage. Some of these habits become "normal", "usual", "everyday habit" and continue till the old age. Therefore, as the age of subjects is smaller, as the chances of shaping healthy behaviors are bigger (Laza, 2006).

3. Behavior modeling strategies

There are various strategies for changing the responsible environmentally behaviors (Bell et al, 2001):

- antecedent strategies – that precede the behavior they are attempting to change (changing the attitudes and values), and

- consequent (or contingent) strategies - that occur after the target behaviors are observed.

Among the **antecedent strategies** can be mentioned:

Attitudes change through persuasive or informational messages which involve making people aware of the scope and nature of environmental problems and of behavioral alternatives that might alleviate them (Fischhoff et al, 1987; Lee et al, 2005). The goal of these messages is to make people care (Uyeki & Holland, 2000).

Using the prompts - cues that convey a message of encouraging a specific behavior (e.g., "thank you for keeping the park clean") or a message of avoidance, which imply a disincentive (e.g., "we frown on those who trample the grass"). These prompts are efficient if they are specific instead general, time dosed, well placed and easy or possible to follow up.

Finally, other antecedent factors include the ***amount of litter already in a setting and the behavior of models***. Generally, litter begets litter – the more littered an environment, the more littered it becomes. In clean environments, people do not litter (Bell, 2001). The behavior of models is well known, especially in children, and especially if we are talking about famous or admired persons (actor or sportsman).

Consequent strategies involve: reinforcement techniques, punishment and feedback.

Reinforcement techniques can be either ***positive*** (reward the people for performing environmentally constructive acts, such as recycling) or ***negative*** (which offers relief from a noxious situation – high energy bills – in exchange for desirable behavior, such as turning down the thermostat). **Punishment**, on the other hand, means an unpleasant consequence occurs (e.g. a fine) as a result of an undesirable behavior. **Feedback** simply provides information about whether one is attaining or failing to attain an environmental goal; it is important if accurate reflect the behavior.

Health education in general, and environment education in particular, represents a national need, many of negative effects upon the environment are consequences of human activities. In October 2007 we started a national project of encouraging some pro-ecologically behaviors in children. Our objectives are a) scientific foundation of children risk behavior; b) encouraging some healthy attitudes and tools; c) quantitative and qualitative assessment of environmental attitudes and behavior changing needs; d) development and implementation of some environmental friendly behavior strategies, and e) assessment of behavior changes long term efficiency.

Our project proposes the elaboration and implementation of an encouraging environmental responsible behavior program amongst children, aiming to improve the life conditions for the entire population.

The originality of this program consists in the development and combination of the existing environmental education approaching (attitude change, negative techniques of punishment of the destructive behaviors), emphasizing the positive technologies, which encourage the environmentally friendly behaviors. Approaching the environmental education in childhood and insisting on the benefits of some individual acts on a personal and collective level, we can form a conscious population, with healthy values and attitudes, which will shape correspondent behaviors (McKenzie, 2000; Oskamp, 2000).

4. Material and Method

The research comprised 3 schools from Cluj-Napoca, Romania. In the first year of the study (2007-2008) we have elaborate and applied complex questionnaires to identify: the presence amongst children of risk behaviors; the perception of environmental risks, and the presence of attitudes and values which need to be changed. Partial results about the project were already published (Laza, 2008; Laza, 2009 – in Romanian).

In the second year (2008-2009) we assessed the correspondence between attitudes/values and the children behavior, using a prospective method. Around these schools were placed collection points for scrap. The experiment lasted for one month. At the end, the scrap was inventoried and weighed, and the correspondence between attitude and behavior was evaluated. In the second part of the second year, the promotion and reinforcement of pro-ecologically behavior were tempted. In every school encouraging pro-ecologically behavior prompts were exposed, focus group and debates about the importance of recycling took place, media examples about how the environment hurts because the human misconducts were commented and the children were awarded that their personal actions might have long-

term consequences upon environmental factors. Then, different invisible marked objects were randomly dissipated around the schools. Based on their identification (in ultra-violet light), or after their weight, the children were rewarded by books, pencils, exercise books…

One year later, the same questionnaires were distributed at the three schools, at the same children, one year older this time. A cross-sectional study was conducted in the third grade and the fourth grade children from three schools in our town: A and B schools from downtown, and C schools from a peripheral and poorer neighbourhood. All the 3rd and the 4th grade classes of the three schools were included in the study, having the consent and a collaborative agreement with the schools' administration.

Anonymous questionnaires, based on international literature, were used, fill in by all the children present the day of assessment; no refusal of participation was recorded, the compliance being enthusiastic.

The 23 items questionnaires, assess children' knowledge, attitudes and behaviours regarding the environment, their perception of acceptable risk, the role model of famous or admired people (actors, sport men), and the importance of positive reinforcement techniques in shaping environmental friendly behaviour.

Mean scores and standard deviations were calculated for all the items described above. ANOVA variance analyses based on children gender, school enrolment and educational level of their parents were used.

In order to gain deeper insights into factors associated with environmental friendly behaviour of children linear regression analyses was also performed. The depended variable was one main environment related behaviour investigated in the study, namely the habit of not throwing away wastes on the street (littering); the independent variables were socio-demographic items (gender, educational level of parents, school enrolment) as well as the items regarding knowledge and attitudes of students with respect to the environment.

5. Results

A number of 411 questionnaires were completed and processed. The number of girls was greater (54%) than boys, excepting the school A. Most of the children come, as expected, from urban environment (93.46%).

Most of the parents at A school (58% of mothers and 65% of fathers) are higher educated. At B and C schools, more of 55% of parents have middle education (high school), especially fathers.

While the problem of the environment is present in the discussions with the children, either at home, or at school (more than 97% of the children discussed about the environment), the percentages are lower for the 3rd grade. The parents' studies are important, as all the children in the 4th grade coming from families with higher studies heard about environment. At the 3rd grade the percentage is higher for the children whose parents are only educated at the high school level.

The children' *knowledge* about environment is good. They received good scores with respect to their knowledge about what the environment is, about what a waste means and what kind of objects could be considered wastes. Girls had higher knowledge than boys concerning the definition of wastes and about what a waste represents. The percentages are higher in central schools and lower in the peripheral school ($\chi^2 = 4.69$; $p = 0.030$).

Over 93% of children know the difference between environmental harmful and protective actions. The best results were noticed in C school ($\chi^2 = 11.18$; $p = 0.001$).

With respect to their *attitudes* regarding the environmental protection, generally children agreed that the environment must be clean; that people can do a lot of things in order to protect the Earth and that if the environment is not protected a lot of problems can appear into the future. No statistical significant differences were noticed between boys and girls with respect to these issues. Moreover, children declared that they know what should be done in order to protect the environment and again, similar results were obtained both for boys and girls.

At the same time, many children and especially girls considered that when somebody is throwing away rubbish, this is a bad thing and they care about this. Nevertheless, fewer children declared they are really acting when somebody

is throwing away rubbish by telling them that this is not good or by collecting the rubbish by themselves and dispose it in a proper way.

Children, also receive high scores with respect to their declared ability in not following the bad example of a famous person who is not behaving correctly and littering on the street. At the same time, many children recognized that if the schoolyard is clean this discourage them from throwing away rubbish; girls receive higher scores with respect to this issue. Children scored quite high their availability of behaving environmentally correct if they would receive a prize/reward.

Regarding the children' *behavior*, we notice that some behaviors such as not littering is more incorporated into children' life, while other environmental friendly behaviors such as going to school by foot or by bicycle instead of going by car as well as water protection by taking a shower instead of a bath are less popular among Romanian children. No significant differences were noticed between boys and girls with respect to their behavior.

Around 70% of children have a proper environmental behavior in A school, but only 58.92% of students from B school ($\chi^2 = 4.02$; $p = 0.045$); C school have an intermediary position.

The children from the peripheral neighborhood recognized higher confidence in their knowledge about how to protect the environment. They received better scores with respect to an environmental friendly behavior, namely going to school with less polluting transport means.

There is a relation between parents' education and the level of knowledge, attitudes and behavior: children from parents with high-level education gave the biggest number of correct answers; nonetheless, the differences were not significant. Children of more educated mothers are more conscious about the dangers that could appear if the environment is not protected. With regard to environmental friendly behaviors, children whose mothers are more educated take more often a shower instead of a bath, but go more frequently to school using more polluting ways of transport.

Comparing the two grades investigated it can be noted that the level of knowledge is better at the 4^{th} grade (96.04% of answers were correct) than at 3^{rd} grade (80.05%; $\chi^2 = 7.32$; $p = 0.007$). Also, the attitudes toward the environment are more expressed in 4^{th} grade but inversely, more students from the 3^{rd} grade are reluctant to the idea of receiving gratification for their environmentally friendly behavior ($\chi^2 = 7.57$; $p = 0.006$). The same aspect can be noted regarding the behavior of students.

The results of the linear regression analyses underline that the behavior of children connected to not throwing away wastes was associated with three other variables: believe that environment must be clean (positive association; standardized beta=0.12, p=0.01); do not care when somebody is throwing away rubbish on the street (negative association; standardized beta= - 0.10, p=0.02); have confidence in their ability of not following a bad example of a famous person who through away rubbish on the street (positive association; standardized beta=0.11, p=0.02).

6. Discussions

The general level of knowledge regarding the environment at the 8-9 year-old children is satisfactory, especially at the girls nonetheless, there are many lacks of perceptions, erroneous perceptions, or insufficient information on this subject.

The level of instruction of the parents, especially the mother, significantly conditions the perception of the environmental factors and risks among children, the cultural level of the family being important for the general knowledge of the children in the early years of their life.

The risk considered as acceptable by children is very low, as they are more tolerant with anything that sounds dangerous for their health. Generally, children appreciate any situation in white and black, and are tempted, when the word "dangerous" appears, to manifest them selves against it. The obtained results allow us to say that they begin to become conscious on the fact that certain substances in the environment become dangerous as they exceed certain limits that are considered tolerable.

The capacity to create an abstract image and to have a perspective view is present in more than 90% of children however few of them still believe that people cannot influence the future of the planet (especially the girls in the 3rd grade). Most of the children who cannot evaluate the future of the planet become from families with middle education.

From the point of view of the preservation of the natural resources, a shower is more indicated than a bath, but the choice between the two, in most of the cases, is not dictated by the environment consciousness. More than half of the children prefer the bath, perhaps due to some cultural characteristics in Romania, the bath representing an appanage of welfare.

In our study, few children walk to school, and even fewer come by bus, most of them coming by car, with their parents, especially in the families with higher education. The very low preference for the bicycle (which is very benefic for health) is explained by the very high risk involved by this, as there are few dedicated tracks in Romania, and Cluj-Napoca is a city with very high road traffic. In the 4th grade, the percentage of children walking to school increases at all the three schools. The number of children transported by car is higher in the families with higher education, reflecting the social and economic status rather than the environmental consciousness.

Anti-environmental behaviors (littering) are more frequent in *A* school and in boys, which is on inverse correlation to their parents' education.

It is well known that there is a very frequent tendency to imitate either a beloved sports person or a famous and admired actor. In our study, most of children are conscious (at the affirmative level, at least) that bad conducts shall not be imitated, however 2.2% of the 3rd grade ones (most of them from *A* and *B* schools) still believe that they can imitate what a public person does, even if this is a bad conduct. The percentage of those who imitate the inappropriate conducts decreases in the 4th grade, but this was noted at the same school (*A* school) and exclusively at the children from modest families.

The existence of the precedents is important, many people being reluctant in throwing down their garbage in a very clean yard, for instance. It is true, for most of the children in our study (63.55%). The percentage is higher for the girls. As the age increases, this attitude becomes less expressed for both genders, which justifies the usefulness of the environmental education at very early ages. Again, for the same aspect, the situation is better at *C* school, where children seem more disciplined and more respectful for the environment, especially if they come from families with higher education.

The gratification of the environmental friendly behaviors seems to impress 2/3 of children from the three schools included in the study, especially them from the peripheral school. Partial processing of the final results has shown that payment offering make children more cooperative and committed, beyond any expectations. This gives us an impulse to continue the initiated project aiming to encourage environmental friendly behaviors by offering material gratifications.

The risk perception in children depends of the prior conceptions acting as decoding filters, however it can be influenced by a targeted education to the environment, correcting the false perceptions and helping the children (who are, generally, very opened to the environmental issues, very malleable and very avid for knowledge) to create a set of perennial values and adopt healthy behaviors.

Pro-environmental education is necessary for children, as they represent a very malleable segment of the population, assimilating much of the received information, and the appropriate environmentally friendly behaviors have the chance to establish permanently.

It might say that environmental education, in its complex and combined shape (antecedent and consecutive methods) is well-timed, children are very receptive, and some healthy behaviors can be everlasting, with long term good effects.

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